National Alliance of Forest Owners
Investing in the Future of America's Forests

July 9, 2010

Sent to *doer.biomass@state.ma.us*

Hon. Phil Giudice
Commissioner
Department of Energy Resources
100 Cambridge St., Suite 1020
Boston, MA 02114

Dear Commissioner Giudice:

RE: Comments on the Biomass Sustainability and Carbon Policy Study

The National Alliance of Forest Owners submits the following views on the Biomass Sustainability and Carbon Policy Study (Manomet Study or Study) prepared by the Manomet Institute for the Department of Energy Resources (DOER). NAFO is the voice of the nation's private forest owners. NAFO's mission is to protect and enhance the economic and environmental values of private forests through targeted policy advocacy at the national level. At the time of this submission, NAFO's members represent 75 million acres of private forests in 47 states. NAFO was incorporated in March 2008 and has been working aggressively since to sustain the ecological, economic, and social values of forests and to assure an abundance of healthy and productive forest resources for present and future generations.

INTRODUCTORY COMMENTS

As stated by the Manomet Institute, the Manomet Study is limited in scope and, therefore, does not provide a complete picture of the relationship between the use of forest biomass and carbon emissions generally and in comparison to fossil fuels in particular. In response to the initial reaction to the Study by your office, both the Manomet Institute and contributors to the Manomet Study have clarified the proper characterizations of their work in recent media statements and press articles: Manomet, "Statement from the Manomet Institute on the Biomass Study" http://www.manomet.org/sites/manomet.org/files/Manomet%20Statement%20062110b.pdf (June 21, 2010); Biomass Energy Resource Center, "Manomet Team Releases Study of Woody Biomass in Massachusetts," http://www.biomasscenter.org/about-berc/berc-in-the-news/256-manomet-study.html (" the headline associated with the AP report: "Mass. Study: Wood Power Worse Polluter than Coal" is not a conclusion that can be gleaned from this study, and is entirely inaccurate"); Pinchot Institute for Conservation, "Massachusetts Releases Study of Environmental Effects of Wood

Biomass Electricity Proposals," http://www.pinchot.org/news/294 ("'Bioenergy technologies, even mass electric power compared to natural gas electric, look favorable when biomass waste-wood is compared to fossil fuel alternatives,'" quoting the Study) (June 11, 2010).

In its statement, Manomet included the following clarifications:

> One commonly used press headline has been 'wood worse than coal' for GHG emissions or for 'the environment.' This is an inaccurate interpretation of our findings, which paint a much more complex picture. While burning wood does emit more GHGs initially than fossil fuels, these emissions are removed from the atmosphere as harvested forests re-grow. As discussed in more detail below, the timing and magnitude of the recovery is a function of forest productivity, land management choices, and technology and fuel characteristics.
>
> The Study did not analyze woody biomass from other sources, for example biomass plantations, land clearing, tree work and landscaping wastes, or construction waste. These materials can be important potential sources of biomass—ones that likely have very different carbon cycle implications than biomass from natural forests—and merit careful and separate consideration in biomass policy development.

These clarifications should provide some degree of caution to the development of policies in response to the Study. When considering the carbon impacts of using forest biomass for energy, policy makers in Massachusetts and elsewhere in the country should also consider the following key factors:

1. The forest carbon cycle is ongoing with no definable beginning or end. Selection of a "baseline" for measuring net forest carbon emissions into the atmosphere through combustion for energy should account for this fact.

2. The net carbon emissions from combusting forest biomass for energy must be measured at the appropriate spatial (area) and temporal (time) scale. A national scale is appropriate for measuring net carbon emissions from forest biomass energy.

3. Total forested area in the U.S. has remained constant for the past century and total forest carbon stocks in the U.S. have been increasing annually for fifty years. This should factor prominently into the determination of the net carbon emissions.

4. The U.S. is a world leader in sustainable forest management and has one of the worlds most mature and sophisticated legal frameworks for sustainable forest practices.

5. Using forest biomass to produce renewable fuel has significant carbon benefits.

COMMENTS

I. The Forest Carbon Cycle is Ongoing with No Definable Beginning or End

Photosynthesis is the ongoing process of converting radiant energy from the sun and CO_2 from the air into the chemical energy of plant tissue.[1] Through photosynthesis, carbon in atmospheric CO_2 becomes carbon in plant tissue, also called biomass. When biomass is burned or otherwise oxidized, the chemical energy is released and the CO_2 is placed back into the atmosphere, completing a natural carbon cycle. As long as this cycle is in balance, the cycle has a net zero impact on the carbon in the atmosphere. As this is an ongoing natural process, there is no basis to define a beginning or end; the process continues and the measurement that should be considered is the overall balance at regular intervals.

This biomass carbon cycle differentiates the carbon in biomass from the carbon in fossil fuels. Fossil fuels contain carbon that has been out of the atmosphere for millions of years. When fossil fuels are burned, therefore, they put carbon in the atmosphere that is in addition to what has been cycling between the atmosphere and the earth, causing the amounts of CO_2 in the atmosphere to increase. Indeed, the primary source of increased CO_2 in the atmosphere since pre-industrial times is fossil fuel combustion.[2]

II. Net Carbon Emissions from Combusting Forest Biomass for Energy Must be Measured at the Appropriate Scale.

A critical element in establishing appropriate policies for use of renewable energy is assessing the ongoing biomass carbon cycle at the appropriate scale. For example, assessing the biomass carbon cycle at the individual plot level ignores the removal of carbon from the atmosphere by trees growing on other plots that will be harvested in future years. By ignoring the ongoing process of the carbon cycle, a plot scale analysis imposes unnatural, and unnecessary, constrictions on the assessment.

If wood-producing land is being re-grown to pre-harvest carbon stocks before it is harvested again, then year-after-year the atmosphere sees a net carbon “emission” of zero across the wood-producing region because the “emissions” from plots harvested this year are offset by the uptake occurring in new growth on other plots that will be harvested in the future. As the Manomet Study exemplifies, assessment limited to a single plot results in a large emission occurring at the time of harvest with slow removal of the emitted carbon from the atmosphere over time as the trees re-grow on the plot. This essentially ignores the forest for the trees.
In the United States, forest carbon stocks continue to grow, indicating that the biomass carbon cycle in the U.S. is continuing to accomplish net removals of CO2 from the

[1] Hall, D. A., *Photosynthesis, Sixth Ed.* Cambridge University Press (1999).

[2] Denman, K. G., *Couplings Between Changes in the Climate System and Biogeochemistry. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press (2007).

atmosphere.[3] Carbon stocks on industry-owned timberland are stable, reflecting the effects of regeneration and re-growth that occurs under sustainable forest management practices.[4] The data clearly indicate, therefore, that in the United States, the biomass carbon cycle is accomplishing net removals of carbon from the atmosphere. In other words, the U.S. forest biomass carbon cycle is in surplus and roughly in balance on industry-owned timberlands.

Unfortunately, Manomet's model of greenhouse gas emissions ignores the overall forest landscape by its focus only on trees that are harvested in any given year and in specific plots. As a result, the model creates a false impression that harvesting depletes forest carbon stocks and is reversed only gradually over a period of years as the specific harvested stands regenerate.

In the real world, carbon stock status is governed by rates of harvesting, growth and mortality at the larger spatial scale. Carbon stock depletions as a result of harvesting specific plots are offset by carbon accumulation on stands that are not disturbed. Thus carbon stocks in the United States are increasing despite ongoing harvesting.

III. The Total Forested Area in the U.S. Stable and Forest Carbon Stocks are Increasing.

There are currently 755 million acres of forestland in the United States, nearly 90 percent is naturally regenerated and 57 percent is privately-owned. 38 percent of the land area is owned by non-industrial, private landowners and 20 percent is owned by corporate landowners. Over the past 100 years forest acreage in the United States has remained relatively stable, and over the past 50 years total growing stock has risen 49 percent and growth consistently exceeds removals.[5] There is every expectation that improved forest management will result in improved growth rates.

IV. The U.S. is a World Leader in Sustainable Forest Practices.

Private forestry operations are governed by a complex set of laws, regulations, and non-regulatory policies at the federal, state and local level in addition to voluntary, third-party certifications. The resulting framework has developed over many years and is now mature and adapted to resources conditions and needs of individual jurisdictions.[6] The effectiveness of this framework has made the United States a world leader in sustainable forest practices.
However, private working forests depend upon reliable markets for continued viability. The U.S. has experienced sustained growth in its forest resources in concert with an

[3] *Inventory of greenhouse gas emissions and sinks: 1990-2008.* Washington, DC: United States Environmental Protection Agency (2010).
[4] Heath, L. S., "Greenhouse Gas and Carbon Profile of the U.S. Forest Products Industry Value Chain," *Environmental Science and Technology* (2010).
[5] State of America's Forests, Society of American Foresters (2007); A Developing Bioenergy Market and its Implications on Forests and Forest Products Markets in the United States: Economic Considerations, Clutter, Abt, Greene, and Siry, National Alliance of Forest Owners (April 2010).
[6] More information is available at http://nafoalliance.org/environmental-regulation-of-private-forests/.

ever-increasing demand for renewable forest products. This is attributable at its core to the fact that viable markets for forest products keep forestland economic compared to other uses – spurring investment in forest management and limiting forest conversion to other land uses that realize a greater economic return.[7] When existing markets for their products are strong, or when new markets like energy emerge, forest owners are able to keep their land forested by investing in tree planting and forest health treatments which in turn keeps their forests economically competitive with other uses.

The Manomet Study frankly focuses on the on the wrong threat. The attention to the so-called "carbon debt" ignores the bigger carbon implication stemming from the loss of forestland permanently to other uses, be they shopping centers, housing developments, even soybean fields, because the private landowner no longer has markets for timber and is forced to convert the land to other uses. Bioenergy development gives the forestland owner an outlet for waste material as pulpwood and sawtimber markets continue to shrink. Preventing the loss of private timberlands to land conversion should be foremost in these policy considerations.

V. Using forest biomass to produce renewable fuel has significant carbon benefits

In evaluating the GHG emissions associated with fuels, a lifecycle analysis ("LCA") incorporates all steps in a "product system" to evaluate broader environmental impacts of products and processes. Work by the Consortium for Research on Renewable Industrial Materials, for example, has documented how managed forests can produce sustained, overall net GHG emission *reductions* when carbon is stored in enduring harvested wood products and/or when harvested wood products are substituted for products with higher energy/carbon footprints.[8] Similarly, the U.S. Department of Energy recognizes the GHG emissions reductions that would result from the use of cellulosic biofuels, stating that, "Cellulosic ethanol use could reduce GHGs by as much as 86%."[9]

EPA has also recognized the beneficial use of biomass to create energy that does not increase carbon in the atmosphere when it is used sustainably.[10] International groups have also recognized this principle, most notably the Intergovernmental Panel on Climate Change[11].

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[7] *Environmental Effects of Agricultural Land-Use Change: The Role of Economics and Policy*, Ruben Lubowski, Shawn Bucholtz, Roger Claasen, Michael J. Roberts, Joseph C. Cooper, Anna Gueorguieva, and Robert Johansson, USDA Economic Research Service. Economic Research Service Report Number 25 (August 2006).

[8] *See* Bruce Lipke et al., CORRIM: Life-Cycle Environmental Performance of Renewable Building Materials, 54 Forest Prod. J. 8 (2004).

[9] U.S. Department of Energy. Ethanol Benefits. Retrieved from the Internet on February 8, 2010 at www.afdc.energy.gov/afdc/ethanol/benefits.html.

[10] U. S. Environmental Protection Agency Combined Heat and Power Partnership. Biomass Combined Heat and Power Catalog of Technologies, 96. September 2007. www.epa.gov/chp/documents/biomass_chp_catalog.pdf; *Inventory of greenhouse gas emissions and sinks: 1990-2008.* Washington, DC: United States Environmental Protection Agency (2010).

[11] *2006 IPCC Guidelines for National Greenhouse Gas Inventories.* Hayama, Kanagawa, Japan: IPCC, c/o Institute for Global Environmental Strategies (2006).

CONCLUSION

The State of Massachusetts through its policy choices can be a leader in the reduction of reliance on fossil fuels. The Manomet Study reaffirms a basic tenet of renewable energy policy by showing that biomass for energy results in significant carbon benefits, especially when compared with fossil fuels, because unlike the latter, it recycles atmospheric carbon. But the final policy must recognize the shortfalls of the conclusions in the Study. The Study asserts that greenhouse gas emissions (GHGs) from power generation are greater in the near-term for biomass than for fossil fuels, and that net reductions in GHGs from biomass energy relative to fossil energy do not become apparent for many years. However, that conclusion is based on an overstatement of near-term GHG emissions from biomass by focusing only on forest plots that are harvested in any given year, ignoring carbon uptake across the broader landscape that is going on simultaneously and has exceeded the removal of carbon for many years.

The prevailing science is clear on the carbon benefits of producing energy from sustainable forest biomass as compared to fossil fuels. Over the long term our nation will be better served by increasing its use of an energy source that recycles atmospheric carbon than by burning more fossil fuels that don't. To sustain the greenhouse gas benefits of the biogenic carbon cycle, trees are re-grown, thus continuing carbon absorption across forested landscapes and ensuring future supplies of biomass. When national inventories, such as in the United States, demonstrate that forest inventories are maintained or increased, there is no additional carbon released to the atmosphere. In contrast, combustion of fossil fuels involves the transfer of carbon from geologic reserves into the atmosphere, also a known scientific principle, increasing net atmospheric concentrations of carbon.

Thank you for the opportunity to comment on this issue which is vital to the global environment and our nation's energy security.

Sincerely,

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